# JunYoung Kim

99, Olympic-ro, Songpa-gu, Apt. 110-1601 Seoul, Republic of Korea
+82(10)-9560-2720 lgkimjy@hanyang.ac.kr linkedin/lgkimjy github/lgkimjy

## Education

**Hanyang University** **Mar. 2020 – Aug. 2022**
*Master of Science, Department of Interdisciplinary Robot Engineering Systems, GPA: 3.89/4.0* *Ansan, Republic of Korea*

- Advisor: *Prof. JeaKweon Han*
- Dissertaion: "A study on the Position Estimation of the 1.3m tall Bipedal Humanoid Robot in a Noisy Environment through Keypoint-based Localization"

**Hanyang University** **Mar.2014 – Feb. 2020**
*Bachelor of Science, Department of Robotics, GPA: 3.19/4.0* *Ansan, Republic of Korea*

## Research Interests

Bipedal/Quadrupedal locomotion, Underactuated systems, Whole-Body Control, Convex Optimization, Optimization-based motion planning, Vision-based Robot Perception, Robot Localization

## Research Experience

**Research Intern** | **Humanoid Robotics Laboratory** **Mar. 2023 – present**
*Korea Institute of Science and Technology (KIST), Advisor: Dr. YongHwan Oh* *Seoul, Republic of Korea*

- Development of Wheel-legged Humanoid Robot [slide]
  - Research focuses on developing dynamic locomotion methods using convex optimization, aiming to actively find the next foot placement and optimal step timing for a point-foot biped robot.
  - Conducting research in MuJoCo simulation, and intending to integrate the developed method into a physical wheel-legged humanoid robot to enhance its mobility.

**Visiting Graduate Researcher** | **Robotics & Mechanisms Laboratory (RoMeLa)** **Jan. 2022 – July 2022**
*University of California, Los Angeles* *Los Angeles, CA*

- Development of Humanoid Robot Localization in Soccer field [slide, demo]
  - Developed a vision-based localization system for the humanoid robot platform. Integrated a particle filter with a CNN-based object detection model to achieve precise localization on the RoboCup soccer field.
  - Verified the proposed algorithm through the Webots simulator and successfully implemented the localization system on the physical humanoid robot, deriving high-precision positioning results.
- Development of the Cooking Dual Manipulator, "YORI"
  - Employed a kinematic controller for multi-joint robots, achieving motion generation in MuJoCo.

**Graduate Researcher** | **HERoEHS Laboratory** **Mar. 2020 – Jan. 2022**
*Hanyang University, Advisor: Prof. JeaKweon Han* *Ansan, Republic of Korea*

- Development of Humanoid Robot, "ALICE ver.3"
  - Developed a kinematic controller for the upper-body module, generating humanoid body motion.
  - Designed and implemented a sophisticated GUI for a humanoid robot platform, resulting in enhancing intuitive interaction and dynamic observational capability.
- Development of Balloon-drone platform for Air Kinetic Art [slide, demo]
  - Conceptualized and integrated UltraWideband Sensor into the robot for a wireless positioning system.
  - Applied Madgwick AHRS algorithm with IMU sensors to align global axes across a total of 50 balloon-drone platforms, enabling effective swarm control.
- Developemnt of Hotel Guidance Humanoid Robots [article]
  - Developed an obstacle detection algorithm utilizing individual 2D LiDAR for each stationary humanoid robot, effectively sensing the customer and enabling their function as receptionists in an unmanned hotel.

- Development of Cooperative robot concept mobile platform to interact in a congested environment
  - Directed project operations as the leader and seamlessly managed both software and hardware teams, resulting in the successful creation of a robot due to efficient workflow and maximized output.
  - Created a mecanum mobile robot with a whole-body concept responsive to external disturbances. Structurally positioned multiple load cells and implemented filters to ensure reactive motion to disturbance forces.

- Development of Service mobile robot with two 6-DOF Dual Arm manipulators, "ABLE"
  - Implemented the Cartographer algorithm for 2D SLAM, enabling autonomous operation.
  - Integrated Speech-to-Text functionality using GoogleCloud API, enabling human-robot interaction.

**Undergraduate Researcher** | **Robotics Laboratory** **May 2017 – Feb. 2020**
*Hanyang University, Advisor: Prof. MinSung Kang* *Ansan, Republic of Korea*

- Capstone Design
  - Established a smart factory management system based on image processing considered of a multi-process environment. A system that allows dual mobile robots to work on a single task cooperatively, such as moving objects from one place to another jointly.

- Development of handrail walking assists for elderly [article]
  - Participated in manufacturing handrail walking assist, subsequently showcased it at COEX.

## Publication / Poster

[c1] **J. Y. Kim**, M. S. Ahn, J. K. Han. "Enhancing AdultSize Humanoid Localization Accuracy: A Vision-based aMCL Leveraging Object Detection Model and Hungarian Algorithm," *International Conference on Humanoid Robots*, 2023 (submitted) [preprint]

[p1] H. J. Kim, D. K. Oh, **J. Y. Kim**, M. S. Kang. "Development of a Sensor Module for Proximity Communication and Obstacle Detection of Handrail Mounted Type Walking Assists," *Korean Society for Precision Engineering*, 2018 [dbpia]

[p2] H. J. Kim, H. J. Kim, D. K. Oh, **J. Y. Kim**, H. J. Byun, M. S. Kang. "Learning to Generate Trajectory of Striking Motion for Two-link Robot Arm in Air Hockey," *Korean Society for Precision Engineering*, 2017 [poster]

[p3] H. J. Byun, H. J. Kim, H. J. Kim, **J. Y. Kim**, M. S. Kang. "Suggestion of Feedback Mechanism of a Walking Assistant with Handrail for the Elderly," *Korean Society for Precision Engineering*, 2017 [dbpia]

## Teaching Experience

**Student Mentor** | Field experiential learning 2019 in Gangwon Career Education Institute

- Mentored and guided 20 high school students, fostering an understanding of robotics, and coordinated international field trips to prominent robotics labs in Korea and the United States.

**Education Mentor** | Hanyang ERICA Summer School 2019 (HESS2019)

- Educated students on using Arduino and designing motor controllers. Students successfully applied the knowledge in developing simple robots, including servo-based manipulators and mobile robots.

## Awards

RoboCup 2022 Bangkok Humanoid League AdultSize Soccer Competition, **2nd Place** **July 2022**
RoboCup Korea Open 2020 Humanoid AdultSize Soccer, **1st Place** **Aug. 2020**

## Certifications

Certificate of Participation in RoboCup 2022 Bangkok **July 2022**
H-Mobility Self-Driving Class, Hyundai Motor Company **June 2022**
Certificate of Participation in RoboCup 2021 Worldwide **July 2021**
Accreditation Board for Engineering Education of Korea (ABEEK) Completion **Feb. 2020**

## Relevant Skills

**Programming Languages**: C/C++, Python, MATLAB
**Simulation Tools**: MuJoCo, Gazebo, Webots, CoppeliaSim
**Computer aided design/engineeing**: SOLIDWORKS
**Software Libraries and Tools**: ROS/ROS2, quadprog, qpOASES, OpenCV, Git, LaTeX, Docker

## Languages

**Korean** (native)
**Chinese** (bilingual)
**English** (fluent)

## Others

**Military Services** | Korea Army, Republic of Korea

- Honorably Discharged.